Coming up with platinum substitutes may be elemental

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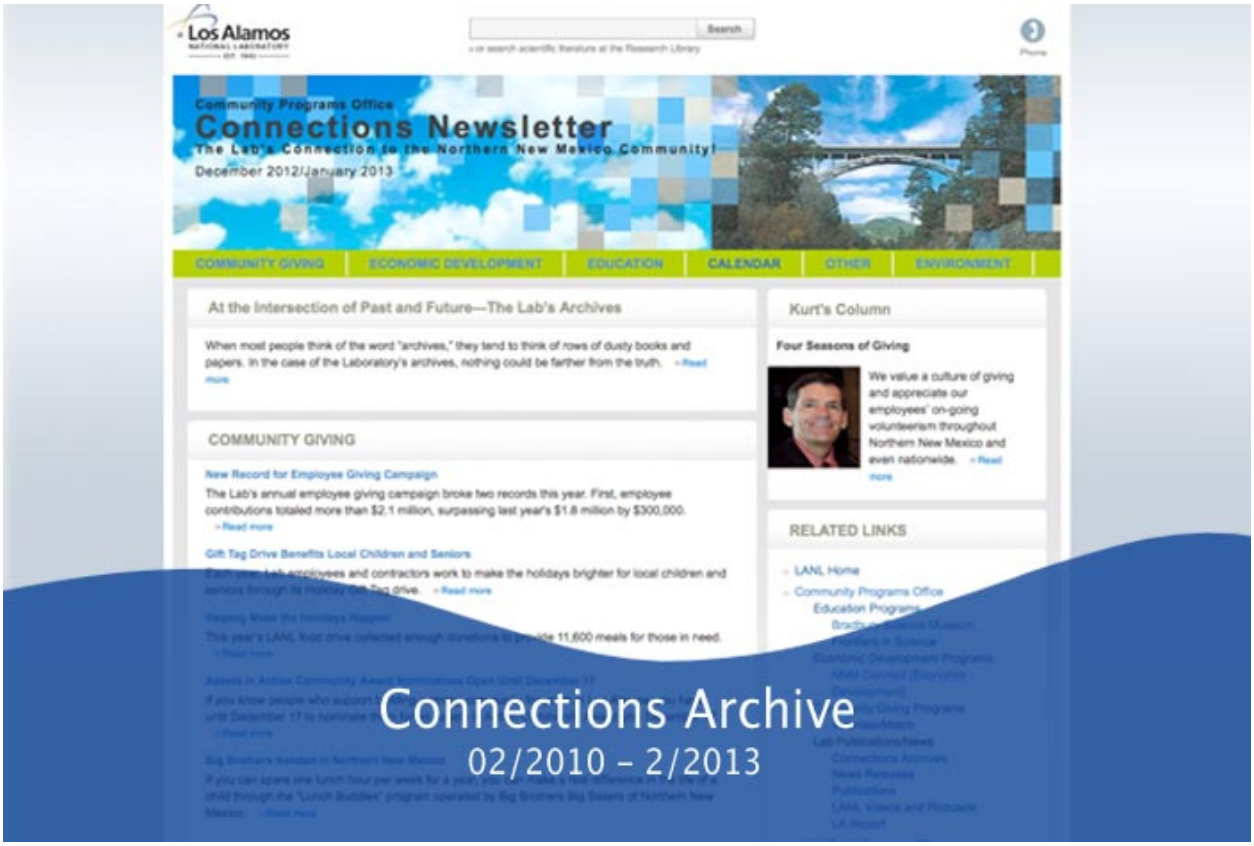

Platinum and some related precious metals (palladium, iridium, rhodium and ruthenium) are frequently used as chemical catalysts and for countless laboratory processes. As rare metals, they are also expensive. To ensure technological advances are not curtailed due to their lack of availability or high cost, Lab researchers are working with an abundant element to take their place: cobalt.

A catalyst differs from a reagent in chemical transformations because a reagent is typically consumed during a reaction, while a catalyst is not. Still, recovery of the metals is not always complete and it's not uncommon to lose a small percent of these dwindling materials. This is a long-term concern for the use of precious metals in industry and by researchers around the world.

Initial findings by a Los Alamos team indicate that if a cobalt atom is captured within a complex molecule, it can mimic the reactivity of platinum group metals. It could then

potentially be used as a catalyst in a wide variety of processes, including the production of biofuels and numerous applications within organic chemistry.

The research is funded through the Laboratory Directed Research and Development's Early Career Program. The cobalt research results made the cover of *Angewandte Chemie: International Edition* late last year in an article titled, "Mild and Homogeneous Cobalt-Catalyzed Hydrogenation of C=C, C=O, and C=N Bonds."

Guoqi G. Zhang and Susan Hanson, both of the Lab's Inorganic Isotope and Actinide Chemistry group and Brian L. Scott, with the Materials Synthesis and Integrated Devices group, are conducting the research.

Match the precious metal to its cost(Precious metal prices change frequently; these prices were captured on a single day and may not reflect their current costs.)A) Iridium 1) $1,600 ounceB) Palladium 2) $88 ounceC) Platinum 3) $710 ounceD) Rhodium 4) $1,040 ounceE) Ruthenium 5) $1,160 ounceBy comparison, cobalt currently sells for about $1 ounce.(Answers: A=4, B=3, C=1, D=5, E=2)